



Illinois Department of Natural Resources

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Pat Quinn, Governor
Marc Miller, Director

December 4, 2009

Mr. Bill Donahue
County Board Office
3rd Floor
6 North Vermilion
Danville, IL 61832

**RE: Invenergy Wind LLC California Ridge Energy Center
Endangered Species Consultation Program
Natural Heritage Database Review #0906735**

Dear Mr. Donahue:

The Department has received information from Invenergy Wind LLC and HDR Engineering, Inc., pertaining to a proposed action in Vermilion County, for the purpose of initiating consultation between the Department and Vermilion County pursuant to the *Illinois Endangered Species Protection Act* [520 ILCS 10/11], the *Illinois Natural Areas Preservation Act* [525 ILCS 30/17], and Title 17 *Illinois Administrative Code* Part 1075.

After reviewing this information, the Department has determined the proposed action is in the vicinity of eighty-five (85) natural resource locations protected under these statutes, including eight INAI Sites registered as Illinois Land & Water Reserves or dedicated as Illinois Nature Preserves. These are listed on the accompanying EcoCAT Report.

It is the Department's opinion most of these INAI Sites and listed species are unlikely to be directly or indirectly adversely affected by the proposed action, but in other cases adverse effects may result in prohibited takings of listed species which may require additional authorizations from the Department.

The Attachment discusses the effects expected at each IDNR-managed property, Illinois Natural Areas Inventory Site, Nature Preserve, Land & Water Reserve, and to each State-listed endangered or threatened species in sufficient detail for County officials to evaluate the project.

Of particular significance is the proximity of the Middle Fork of the Vermilion National Scenic River. At no point will the project physically encroach upon lands and waters which are formally protected by law. Nevertheless, there may be some potential for visual impacts to persons using the National Scenic River corridor. In view of the economic importance of the

National Scenic River to the County, and its unique status within Illinois, the Department recommends the County conduct or request a visibility analysis which identifies the location and character of visual impacts, or which demonstrates that none will exist.

The Middle Fork Vermilion River, itself, provides essential habitat along and within its waters for no fewer than sixteen State-listed endangered or threatened species. High water quality, including consistently cool water temperatures, is the key characteristic supporting these species. All areas within the proposed project footprint in Vermilion County drain to the Middle Fork. Consequently, the Department recommends the County require measures to assure that siltation, sedimentation, and thermal pollution are minimized or avoided during construction and operation of the project.

Five species of State-listed endangered or threatened birds are known to breed in the vicinity of the proposed project, while numerous migratory species pass through the area. In addition, the federally-listed Indiana Bat is a likely summer resident of the riparian woodlands of the Middle Fork and Salt Fork. The Department recommends the County require pre-and post-construction studies of avian use and bat activity of the project area, including acoustic monitoring of bat calls, with mortality studies following construction, to be filed with the County when completed. Any taking of endangered or threatened species should be promptly reported to both the County and to the Department.

The Department's consultation process for this proposal is terminated, unless the County desires additional information or advice related to this proposal. However, consistent with Part 1075, the County must notify the Department of its disposition of recommendations pertaining to species or sites subject to the consultation process.

Termination does not imply the Department's approval or endorsement of this proposal. Consultation is valid only for a two-year period; if the proposed action is not implemented in that time, a new consultation will be necessary. The Natural Heritage Database is unable to state that no listed species exist within the project footprint, nor can it exclude the possibility that listed species other than those mentioned exist in the vicinity.

Should you need additional information regarding the consultation process, or should you have any questions, please do not hesitate to contact me.

Sincerely,

A handwritten signature in dark ink, appearing to read "Keith M. Shank". The signature is fluid and cursive, with the first name "Keith" being more prominent.

Keith M. Shank
Impact Assessment Section
Division of Ecosystems and Environment
Ph. (217) 785-5500
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cc: Jeff Veazie, Invenenergy LLC, Inc.
Jacqueline Hamilton, HDR, Inc.

Attachment

Invenergy California Ridge Wind Energy Center Vermilion County

Wildlife Impact Recommendations

Vermilion County may wish to consider permit conditions requiring the applicant to monitor, assess, and report possible fish and wildlife effects of the proposed action in the following ways.

- § Evaluate the visual impacts, if any, of the project to recreational users of the Middle Fork National Scenic River.
- § Incorporate best management practices to minimize risk to federally-listed and state-listed species, as outlined in this Attachment. Focus should be on appropriate avoidance and minimization of habitat disturbance, with mitigation measures implemented as applicable.
- § Where feasible, permanent engineering solutions to soil erosion and water quality issues should be required and maintained, particularly with reference to service and access roads.
- § Perform pre-construction assessments of avian and bat usage within the project area. Such assessments should include inventories of habitat types in and near the project area, including crop rotations or choices, and observations of both migratory and resident bird usage. Consideration of all seasons should be included, although spring migration is anticipated to be of greatest interest. Acoustic bat activity monitoring is also appropriate, particularly during the fall migratory season when activity would be expected to be highest. Specific federally-listed and state-listed species of interest are discussed in the following narrative. Risks to protected species should be evaluated and appropriate regulatory permits sought for potential incidental taking of protected animals.
- § Perform at least one year of post-construction monitoring and assessment, noting any changes in wildlife usage patterns and evaluating potential causes of such changes.
- § Consideration should be given to periodic repetition of the post-construction wildlife surveys during the life of the project.

Natural resources within, or in the vicinity of, the proposed wind energy facility are listed below, along with a discussion of potential issues.

Coal Resources

According to the Illinois State Geological Survey databases, no known past coal mining locations are associated with the proposed project footprint, despite the presence of significant coal resources. However, the developer may wish to verify the ownership of the mineral rights beneath turbine lease locations to determine if mining conflicts exist, whether past or future, which might pose issues of geologic stability for wind turbines.

State Lands; Nature Preserves; Land & Water Reserves; and INAI Sites

National Scenic River - Middle Fork of the Vermilion River

A portion of the Middle Fork comprises the State's only designated National Scenic River. The reaches of the River closest to the project area (less than two miles) are formally protected as a National Scenic River where title (fee or easement) is held by the Illinois Department of Natural Resources, but this legal protection extends only 500 feet from the River's center-line. However, in this area the River lies in a valley more than 100 feet below the uplands likely to host turbines, and the valley walls are typically forested, circumstances which should considerably reduce the visibility of turbines to recreational users of the River. Nevertheless, it may be that from some points on the River turbines may be visible.

A visibility analysis is appropriate to determine to what degree the operation of wind turbines in the project area may degrade the recreational experience of persons on the River, and the County may wish to consider the impacts to economic benefits derived from tourism and recreation.

The river's riparian corridor forms an important avenue for the movement of all forms of wildlife, providing food and shelter for both migrant and resident species. By no means is wildlife limited to this area, however. Recent radar-based studies along the Illinois River demonstrate that even waterfowl may arrive and depart cross-country, rather than following the river. Hence, distance from the river provides no assurance that wildlife commonly found there will not also occur within the project area.

Erosion related to wind energy facility construction and operation has the potential to adversely affect the Middle Fork and its tributaries through siltation and sedimentation, while disruption of field tile systems may temporarily or permanently adversely modify the prevailing thermal regime in feeder stream habitats essential to Middle Fork fish, reptiles, amphibians, and mussels, including many State-listed endangered or threatened species, several of which are unique to the Vermilion River system in Illinois.

Measures should be adopted to minimize erosion and siltation related to construction and maintenance of the project, and to facilitate tile repairs. Fortunately, much of the project is located outside of the watershed of that portion of the Middle Fork which is designated as National Scenic River.

Middle Fork of the Vermilion River INAI Site

The Middle Fork of the Vermilion River is a designated Illinois Natural Areas Inventory (INAI) Site, from its confluence with the Salt Fork east of Oakwood, upstream to the northern boundary of Champaign County, well beyond the reaches designated as National Scenic River. The Middle Fork, its tributaries, and its riparian forests support a plethora of federally-listed and State-listed endangered and threatened species, including protected mussels, fish, amphibians, reptiles, bats, raptors and other birds. All drainage from the north side of the project, whether in Vermilion or Champaign Counties, enters the Middle Fork INAI Site.

High water quality is a hallmark of this stream. Erosion related to wind facility construction and operation has the potential to adversely affect tributaries and the Middle Fork through siltation and sedimentation, and to adversely modify feeder stream habitats essential to Middle Fork fish and mussels, several of which are unique to the Vermilion River system in Illinois.

Salt Fork of the Vermilion River INAI Site

The Salt Fork is designated as an INAI Site from a point northwest of Homer downstream to its confluence with the Middle Fork. This reach of the River supports numerous aquatic listed species of fish, mussels, reptiles, and amphibians, including the **Mudpuppy Salamander**, the **Bigeye Chub**, **Bluebreast Darter**, **River Redhorse**, **Blanding's Turtle**, **Wavy-Rayed Lampmussel**, **Purple Wartyback**, and the **Salamander Mussel**.

The Salt Fork receives the drainage from the **Spoon River INAI Site**, and from Stoney Creek and Feather Creek. All three of these streams drain significant portions of the proposed project area.

Spoon River INAI Site

The Spoon River is a tributary of the Salt Fork of the Vermilion River, located entirely within Champaign County south of Gifford. Although it is completely channelized and maintained by the Spoon River Drainage District, it has been designated because it retains unusually high fish diversity, likely due to its constant influx of cool tile drainage. While this resource is not located in Vermilion County, a decision by Vermilion County to proceed has implications for the Spoon River INAI.

The Spoon River INAI could be adversely modified by erosion and siltation related to turbine construction, and by disruption of the numerous agricultural tile-drains which feed it and maintain its temperature.

Middle Fork State Fish & Wildlife Area

The 4,120-acre Middle Fork SFWA occupies lands on both sides of the Middle Fork River, the nearest of which about the project area's eastern boundary. The formally-designated National Scenic River begins at the north boundary of the SFWA and extends southward to Rt. 150. Turbines will be visible from within the SFWA, from along its western margins, and perhaps from high ground east of the Middle Fork of the Vermilion River.

The Department believes that only a small area at the southwest corner of the SFWA may be potentially swept by "flicker" effects, but it also believes that screening vegetation and topography will prevent flicker shadows from impinging on IDNR property.

In addition to a Nature Preserve, a Land & Water Reserve, five INAI Sites, and numerous state-listed endangered or threatened species within its boundaries, the SFWA also constitutes an important staging area for both migratory birds and bats, which may increase the risk of wildlife colliding with turbine blades due to the project's near proximity.

Other indirect, cumulative effects from the project (siltation and erosion) may be incurred via the river corridor.

Kickapoo State Recreation Area

This 2,700-acre State Park, once heavily strip-mined for coal, is one of the State's most popular camping, boating, fishing, and recreation destinations. Outdoor recreation is an important factor in Vermilion County's economy. The Park is located mainly north of Interstate 74, on both sides of the Middle Fork. It contains the lower terminus of the National Scenic River designation, and provides essential habitat for a large number of State-listed endangered or threatened species.

The closest portions of the wind energy project area lie less than one mile from the Park's northwestern corner. Wind turbines will be easily visible from the western boundaries of the Park at many locations, though most visitor activities will be concentrated in areas where visibility will not be an issue due to topography and land cover.

Kennekuk Cove County Park and INAI Site

This INAI Site is located on the southern portions of the 3,000-acre Kennekuk Cove County Park, a property managed by the Vermilion County Conservation District, on the east bank of the Middle Fork. The INAI Site at its nearest is about two miles east of the project area. No part of the Park receives drainage from the project area, except by way of the Middle Fork.

However, because of its position on high ground east of the Middle Fork, wind turbines may be visible from some portions of the County Park.

The major biological significance of the Park's proximity is that it provides significant staging and breeding habitat for bats and migratory birds, including the State-listed endangered Northern Harrier.

Kinney's Ford Seep Land & Water Reserve and INAI Site

Kinney's Ford Seep LWR lies within the northern part of the Middle Fork SFWA, two miles northeast of the closest portion of the project area, near the confluence of Collison Branch Creek with the Middle Fork. Despite its proximity to the project, topography makes it unlikely turbines will be visible from within the Reserve, or that "flicker" effects will be present at any time of year. The seep community of this Site is sensitive to ground water recharge impacts, but no project activities will be performed within the likely ground water recharge zone of this protected area.

Horseshoe Bottom Nature Preserve and INAI Site

This 100-acre Nature Preserve, as its name implies, is located in the Middle Fork bottoms, less than two miles northeast of the project. However, topography and land cover render it unlikely that turbines will be visible from the Preserve. Among its other biological values, it provides essential habitat for the State-listed endangered **Blanding's Turtle**.

Middle Fork Seeps INAI Site

These forested seeps are located on the *eastern* valley wall of the Middle Fork, facing the project, about 1.5 miles from the project area. Turbines may be visible to visitors in the winter, following leaf-fall, since the western valley wall at this point has little forest cover. Since it lies on the east bank, there is no potential for project activities to affect or alter ground water recharge zones for the seeps.

Fairchild Cemetery Prairie/Savanna Nature Preserve and INAI Site

This small (< one acre) Nature Preserve is part of the Kennekuk Cove County Park complex. It is located about 3.5 miles east-northeast of the project area and east of the Middle Fork. Because it lies on relatively high ground near the headwaters of Windfall Creek, project turbines may be visible to Nature Preserve visitors, although they may be screened by the forested bluffs of the Middle Fork SFWA or other intervening land covers.

Windfall Prairie Nature Preserve and INAI Site

This 60-acre Nature Preserve is located on the *east* bank of the Middle Fork, rising from the River to the top of the eastern bluffs, facing the project. In addition to riparian forest, it contains hill prairie and calcareous seep natural communities, and contains at least one State-listed endangered plant (**Wolf's Bluegrass**, *Poa wolfii*).

Because the nearest portions of the project area, only two miles southwest of the Nature Preserve, are of equal or higher elevation to the prairie areas of the Nature Preserve, and turbines will likely reach nearly 400 feet higher than that, it is likely that turbines will be visible to visitors in the Nature Preserve, although such visibility could be seasonal, limited to periods when the Preserve's deciduous trees are bare.

Orchid Hill Natural Heritage Landmark INAI Site

This 120-acre Natural Heritage Landmark INAI Site is home to an unusual number of native orchids and other rare plant groupings. Located adjacent to the extreme eastern end of the project area, near the existing coal-fired power plant, this forested area marches down the western bluff of the Middle Fork valley. Turbines are unlikely to be visible from the western margins of the INAI Site, due to screening vegetation, which will also serve to prevent flicker shadows from affecting the Site.

Middle Fork Woods Nature Preserve and INAI Site

This 77-acre Nature Preserve within Kickapoo State Recreation Area provides essential habitat to the very rare endangered **Silvery Salamander**. The Preserve is located about 2.5 miles south and east of the project area. Because it is completely surrounded by forest, no turbines will be visible from within the Preserve, nor does it lie in a watershed which may be affected by turbine construction.

Rock Cut Road Botanical Area INAI Site

Located just southwest of Middle Fork Woods, above Glenburn Creek but outside Kickapoo SRA, this INAI Site provides essential habitat for the State-listed threatened **Fibrous-Rooted Sedge**, *Carex communis*. Distance and topography assure this INAI Site and its population of the Fibrous-Rooted Sedge will not be affected by the proposed project.

Larimore's Salt Fork of the Vermilion Land and Water Reserve and INAI Site

This LWR consists of the channel and floodplain of the Salt Fork Vermilion River south of Muncie. In a valley and five miles south of the project area, the LWR will sustain no effects from the proposed wind farm.

Edgewood Farm land and Water Reserve and INAI Site

Located along the Salt Fork southeast of Ogden, and more than seven miles from the project area, the higher elevations of the LWR exceed 660 feet MSL, about the same elevation as the wind farm. Consequently, wind turbines may be visible from the higher elevations within the LWR unless forests on the opposite side of the Salt Fork valley are tall enough to screen them. However, at that distance, visibility is not likely to be obtrusive to site users.

Pellville Cemetery INAI Site

Pellville Cemetery lies 14 miles north of the project area, just west of Rankin and on the opposite side of the Middle Fork's valley. A keen-eyed observer at Pell Cemetery might possibly be able to see California Ridge turbines under conditions of excellent visibility, but they are unlikely to intrude on a visitor's experience. The Cemetery supports breeding pairs of the Henslow's Sparrow and other migratory birds, whose migratory passages could pose issues for the project.

Henschel Workman State Habitat Area

The Department's 135-acre Henschel Workman State Habitat Area is located southeast of Rankin in Vermilion County, about 13 miles north of the project footprint. It supports breeding Henslow's Sparrows and provides a large expanse of suitable wintering habitat and migratory staging area attractive to other migratory and State-listed bird species, whose migratory passages could pose issues for the project.

Sleeter State Habitat Area

The 103-acre Sleeter SHA is located about 1.5 miles northwest of Gifford in Champaign County. It lies eight miles northwest of project areas within Vermilion County, but only four miles from the nearest project areas in Champaign County. Turbines located in both Champaign and Vermilion Counties will be visible to site users, but this should have little impact on hunting activities, the major recreational use of this site. However, the Sleeter SHA may be a focal point for birds whose migratory passages could pose issues for the project.

Documented Listed Species In The Vicinity

Indiana Bat, *Myotis sodalis*

Summer nursery colonies of this bat, listed by the federal government and Illinois as endangered, have been documented in forested riparian tracts along the Middle Fork of the Vermilion River and the Big Four Ditch in Ford County, north of the project area, and along the Little Vermilion River in the southern half of Vermilion County. It is reasonable to assume that this species traverses or roosts in the intervening segments of the Vermilion River system.

Nursing females may forage above crop-fields a mile or more from the nursery colony. This species winters in caves or mines some distance from summer habitats, but its migratory behavior is poorly understood. No hibernation sites are known from Vermilion County, although critical hibernating habitat is known in LaSalle County. It is surmised that bats using the Middle Fork for summer habitat most likely migrate from hibernation sites in southwestern Indiana and Kentucky, although a banding study in the 1970's indicated that at least some LaSalle County bats move in this direction.

The risk to bats from collisions with moving wind turbine blades appears to be much higher than for birds. To date, no Indiana Bats have been documented as killed by wind turbines. But, until recently, no utility-scale wind farms have been proposed or constructed within the range of Indiana Bats, so the risk to this species from wind turbines remains unquantified.

The project area itself appears to contain no potential summer nursery or roosting habitat for the Indiana Bat, but directly abuts riparian forests; individuals roosting along the Middle Fork may forage above fields within the project area.

Because the winter hibernation sites of these bats are unknown, the greatest risk may be to Indiana Bats migrating across or through the project area. Efforts to identify and monitor the foraging and migration behavior of this bat population may establish the degree of risk which this facility would pose to this species.

The Department is unable to evaluate the potential for an incidental take of an Indiana Bat at this facility based on existing data; capture studies along creeks in the nearer vicinity of the project may be advisable. More common bat species undoubtedly occupy habitats in the vicinity, and are at risk of mortality, directly through collisions with wind turbines, or indirectly through barotrauma (lung hemorrhages caused by extremely low air pressures in the vortices created by wind turbine vanes).

Vermilion County is particularly rich in bat fauna: a 1996 netting survey on the Little Vermilion River east of Georgetown captured seven of nine species whose ranges include Vermilion County: the Eastern Red Bat, Hoary Bat, Northeastern Myotis, Eastern Pipistrelle, Big Brown and Little Brown Bats, in addition to the Indiana Bat. An acoustic bat survey is recommended, particularly during the fall bat migratory season (August 1 through October 31) when activity would be expected to be the highest, in order to characterize bat activity in the project area. A high level of bat activity may warrant post-construction mortality studies.

Blanding's Turtle, *Emydoidea blandingii*

Effective October 30, 2009, the Blanding's Turtle was listed by Illinois as "endangered

The Blanding's Turtle, distinguishable by its solid bright yellow lower jaw and throat, has been documented most recently in the Middle Fork SFWA (Horseshoe Bottom Nature Preserve), about two miles from the project area. No estimate of the local population size is available, but observations are rare, suggesting few individuals. While the existing population may be small and localized, the entire Vermilion River system is accessible to this species. In Northern Illinois, the species frequently ascends waterways to access open upland areas for nesting.

The Blanding's Turtle reaches sexual maturity only after 15-20 years, and has a documented life-span beyond 70 years, although females beyond age 50 may not be reproductively active. This species is known to move widely across the landscape, following streams and drainage ditches, but also moving overland when necessary. Overland movements typically occur at night. It is believed to demonstrate fidelity to nesting and hatching areas, attempting to return to its own natal site for egg-laying. The species is known to nest farther from the water than any other aquatic turtle in North America, at times nesting up to a mile inland. The species' life cycle appears to be compatible with row-crop agriculture, since egg-laying occurs in late spring or early summer after planting, and hatching usually occurs before harvest. Vermilion County lies near the southern limits of the species' range, so overwintering in the nest by hatchlings should be a rare occurrence.

The main threats to this species are nest predation by skunks, raccoons, and other mammalian predators, road-kill, and poaching (illegal collection for the pet trade). Wind energy construction

activities may result in disturbance of traditional nesting areas, the destruction of nests, the entrapment of individuals in excavations, and road-kill.

Workers on the project should be educated about this species' appearance and behavior; excavations left open overnight should be covered and inspected before filling; and any Blanding's Turtle observed should be documented with photographs and reported to the Department of Natural Resources. A Turtle may not be moved to facilitate the project unless the applicant has obtained an Incidental Take Authorization.

Smooth Softshell Turtle, *Apalone mutica*

Effective October 30, 2009, the Smooth Softshell was listed by Illinois as "endangered

This aquatic turtle inhabits larger streams and rivers, in segments with sandy substrates and sand bars. Regarded as a delicacy by many fishermen, this species has suffered from over-collecting, while pollution, siltation, and sedimentation have degraded many habitats. This species has been documented in Vermilion County, and it is potentially present in all reaches of the Vermilion River system.

Unless transportation of wind turbine components requires the upgrade or reconstruction of bridges, there should be little risk of direct adverse effects to this species. Erosion and siltation pose indirect threats.

River Redhorse, *Moxostoma carinatum*

The State-listed threatened River Redhorse is a member of the sucker family which feeds largely on invertebrates, including young mussels and crustaceans, for which it possesses specialized grinding teeth. It prefers medium-to-high-gradient rivers and streams with clean sand, gravel, and cobble substrates. The River Redhorse has been recorded in the Middle Fork as far north as the Middle Fork SFWA, but is more common in the Salt Fork.

Erosion related to turbine construction and maintenance may degrade stream-bed habitats or suppress populations of prey species. Because the River Redhorse rarely ascends small tributaries, direct adverse effects are unlikely.

Eastern Sand Darter, *Ammocrypta pellucidum*

This small fish is listed by Illinois as "threatened." Restricted to streams in the Wabash drainage of Illinois, it requires high water quality and bottom substrates of clean sand in fairly swift waters, requirements satisfied by all branches of the Vermilion River. Soil erosion and sedimentation pose the main threats to this species, followed by chemical pollution.

Bigeye Chub, *Hybopsis amblops*

The State-listed endangered Bigeye Chub is another small fish found only in the Wabash River watersheds of Illinois, but generally in smaller creeks and streams. It is present in the Middle

Fork, the Salt Fork, and Stoney Creek. Degradation of water quality and alteration of stream habitats are the main threats to this species.

Mussels

The Salt Fork, Middle Fork, and North Fork of the Vermilion River, and their tributary creeks, provide essential habitat for a large number of freshwater mussels, among the most endangered organisms in North America. High water quality remains the most essential habitat requirement.

Federally-listed species found, or once found, in these streams include the **Clubshell**, *Pleurobema clava*, and the **Riffleshell**, *Epioblasma torulosa*. A cooperative program between the U.S. Fish & Wildlife Service and the IDNR is planned to re-introduce the extirpated Riffleshell, and to augment the existing Clubshell population.

Headwater streams are most likely to support populations of the **Slippershell**, *Alasmodonta viridis*, and the **Little Spectaclecase**, *Villosa lienosa*. Broadly distributed lower down are populations of the **Wavy-Ray Lampmussel**, *Lampsilis fasciola*; **Rainbow**, *Villosa lienosa*; **Purple Wartyback**, *Cyclonaias tuberculata*; **Kidneyshell**, *Ptychobranhus fasciolaris*; **Rabbitsfoot**, *Quadrula cylindrica*, and **Purple Lilliput**, *Toxolasma lividus*.

The **Salamander Mussel**, *Simpsonaias ambigua*, is the only species in its genus, and is also unique among North American mussels as the only species with a non-fish glochidial host, the **Mudpuppy**, *Necturus maculosus*. The Salamander Mussel has been documented at seven locations in Vermilion County since 1980, in the North Fork, the Middle Fork, and in Stony Creek, a tributary of the Salt Fork. A small mussel (two inches or less), and commonly found beneath rocks and debris, where the Mudpuppy spends much of its time, the Salamander Mussel is likely under-sampled by the typical non-targeted mussel survey, and may be more locally common than these records indicate.

Four-Toed Salamander, *Hemidactylium scutatum*

This four-inch-long amphibian is present in the riparian forests along Collison Branch Creek in the Middle Fork SFWA. While woodland vernal pools used for breeding may be the most essential habitat component for this species, this salamander may be found more than a thousand feet from the nearest wetlands, beneath forest floor litter and detritus where sufficient moisture is available. This species will not be found in grasslands or row-crop fields.

It is unlikely this species occurs within the project footprint. However, good water quality remains important; Collison Branch rises in Section 9 and 10 within the project area. Sound erosion controls in these areas will be important in maintaining good habitat conditions downstream.

Silvery Salamander, *Ambystoma platineum*

This six-inch-long salamander is unusual because its population is entirely female; egg production is stimulated by exposure to the sperm of the much more common **Small-Mouthed**

Salamander, *Ambystoma texanum*, which commonly shares its habitats, but there is no genetic interplay. (But this also means the presence of *A. texanum* is a crucial factor for the successful reproduction of *A. platineum*.) The Silvery Salamander may also occur with the endangered **Jefferson Salamander**, *Ambystoma jeffersonianum*, from which it cannot be distinguished except through analysis of its DNA chromosome count or the size of its red blood cells. (The populations in question here have been established by these tests to be Silvery Salamanders.)

A population within the Kickapoo SRA is beyond the range of effect from the proposed project. A second population, however, in Middle Fork Woods SFWA, five miles to the north, has a breeding pond less than a mile from portions of the project area draining to Gimlet Branch Creek. While the existing breeding pond should not be at risk from effects stemming from the project, a species recovery effort is now underway to create or enhance potential new breeding areas extending as far south as Cox Hollow, which drains the easternmost portions of the project area.

Salamanders can disperse surprising distances where suitable cover exists, and may potentially occur in any local woodlands, upland or lowland, which are connected to the more-or-less continuous riparian forest along the Middle Fork. Developers should avoid any direct impact to woodlands along streams feeding the Middle Fork, to assure any takings of listed salamanders are avoided.

Mudpuppy, *Necturus maculosus*

Effective October 30, 2009, the Mudpuppy was listed by Illinois as "threatened."

The Mudpuppy is the only known glochidial host of the State-listed endangered **Salamander Mussel**, *Simpsonia ambigua*, a species which is now being evaluated for federal listing under the Endangered Species Act; the decline of the Mudpuppy may be a major factor in the disappearance of the Salamander Mussel.

The Mudpuppy never develops beyond an aquatic larval stage, and so is never found in terrestrial habitats. It inhabits clear rivers, creeks, streams, lakes, and ponds, but conceals itself under rocks or woody debris during the day, feeding actively at night. It typically goes unseen except by fishermen, who sometimes catch it inadvertently. It can cope with some siltation and sedimentation so long as clear gravelly headwater areas remain available for reproduction.

The Vermilion River system is one of the last "strongholds" for this species in the state, and it should be presumed to be present throughout. Stony Creek drains the central portion of the project area, and has the most recent records for the Salamander Mussel, indicating a Mudpuppy population is present in Stoney Creek. The species has also been reported from the Middle Fork SFWA.

Cool or cold water is essential for this species, which remains active all winter; water temperatures above 72°F are harmful, and those above 77°F can be fatal. Agricultural tile drainage helps lower and maintain stream temperatures, but the removal of riparian trees and shrubs exposes streams to direct solar radiation and heating. In-stream cover provided by rocks

and woody debris is essential for concealment and reproduction, since eggs are suspended from the bottoms of rocks and logs. The common belief that removal of woody debris from stream channels improves drainage is a factor in the decline of this species.

Major threats include pollution, siltation and sedimentation, stream channelization, and woody debris removal. The main risks associated with wind energy projects will be direct stream modification through the repair or upgrade of roads, modification of aquatic thermal regimes through the disruption of agricultural tile drainage systems, and siltation and sedimentation associated with construction and permanent features, such as service roads, which suppress prey populations and render spawning areas unsuitable. Any planned in-stream work may require an Incidental Take Authorization.

Least Bittern, *Ixobrychus exilis*

This small heron nests in the emergent vegetation of marshes. It has been documented from Kennekuk Cove County Park in Vermilion County, and from wetlands near the Middle Fork in northeastern Champaign County.

Known breeding locations are unlikely to be affected by the project, although there may be a collision risk for migrating Bitterns. Generally speaking, waterfowl are rarely the victims of collisions with wind turbines, so this risk may be low.

Northern Harrier, *Circus cyaneus*

The State-listed endangered Northern Harrier is a ground-nesting grassland hawk. It has been recently documented as nesting in Vermilion County, both within--and within a few miles of--the project footprint. Also a frequently-observed migrant, the species has a statewide range. While many sources indicate the species needs large open areas of habitat, Illinois studies have demonstrated this hawk can use relatively small patches of habitat for successful breeding, especially in the vicinity of larger habitats. Breeding is often associated with wetlands such as marshes, sedge meadows, and wet prairies.

While most hunting activities occur at fairly low altitudes, below typical rotor-swept elevations, hunting can expose this bird to collision risk. Like the Upland Sandpiper, this species engages in an aerial courtship display which places it at risk of collision with wind turbines. Wind farm construction and operation may alter concentrations of prey species.

This hawk relies heavily on its acute hearing to locate prey, and--if the noise generated by wind turbines interferes with this function (which is not known to be the case)--turbines might adversely affect their ability to hunt near the turbines, reducing available food resources.

If pre-construction surveys indicate use of the project area by migrant Harriers, post-construction surveys should be performed to determine whether the Harrier continues to hunt territories in proximity to turbines.

Barn Owl, *Tyto alba*

This endangered raptor nests in larger tree cavities and in barns or abandoned buildings, sometimes within city limits. A breeding record exists for Champaign County, about four miles northwest of Rantoul; none have been recorded from Vermilion County since the species was listed. This owl hunts both open woodlands and grasslands; its preferred prey consists of small rodents such as mice and voles. The main risk posed by wind power facilities to this species is the removal of suitable nesting trees and abandoned buildings to facilitate transportation of wind turbine components or to maximize wind energy conversion. Both trees and buildings should be examined for Barn Owl occupancy prior to removal.

Short-Eared Owl, *Asio flammeus*

The endangered Short-Eared Owl nests and winters in grasslands and wetlands. Vermilion County lies in both breeding and wintering ranges, and breeding Short-Eared Owls were reported from two separate locations in Vermilion County in 1990. Large numbers of wintering owls are observed annually in suitable winter habitat in Iroquois County.

Highly nomadic, the Short-Eared owl depends heavily on vole and mouse populations, and the size of its breeding and hunting territories varies inversely with prey population sizes. When prey populations are high, owls may be ground-roosting every few meters in suitable habitat. The Northern Harrier often harasses this Owl, stealing its food.

This Owl's hunting flights are often less than ten feet off the ground (a circumstance which makes this bird highly vulnerable to collisions with vehicles); during aerial mating rituals, flights occur at typical wind turbine rotor-swept height. This Owl is highly dependent on its acute hearing to locate and seize prey. The degree to which noise from wind turbines may interfere with predation behavior is unknown.

The effects of wind turbines on Short-Eared Owls may be heavily influenced by the proximity of turbines to breeding, roosting, and hunting areas. Once turbines are built, this proximity relationship will be subject to change as land owners alter land management practices. This is likely to be of concern mainly if attractive habitat for Owls and their prey is created within or near the turbine array following construction.

Upland Sandpiper, *Bartramia longicauda*

This State-listed threatened grassland bird prefers habitat of short-grass prairie/pasture. For many years this ground-nesting species was thought to be area sensitive, requiring ten acres or more of grassland habitat for successful breeding. However, many recent breeding efforts are occurring in grassed waterways of row-crop fields, which provide considerably less than ten acres of habitat, and from along roadsides.

A breeding record exists for Vermilion County, near the Danville airport. Additional breeding records are associated with the University of Illinois and the Champaign-Urbana Airport.

The Upland Sandpiper engages in an aerial courtship display which passes through the rotor-swept elevations of utility-scale wind turbines, placing it at risk of collision mortality. Whether this species will be sensitive to the proximity of vertical structures, or to shadow "flicker" on potential nesting areas, has not been demonstrated.

The Department recommends mapping all habitat types within the project footprint, and checking even relatively small areas of appropriate habitats for the presence of this species prior to any initiation of construction disturbance during the breeding season.

Potential Listed Species

Franklin's Ground Squirrel, *Spermophilus franklinii*

The State's largest ground squirrel was listed as "threatened" in 2004. Most active above-ground on sunny days in late spring and early summer, this species hibernates for seven to nine months of the year. It prefers taller vegetation than other ground squirrels, and so is seldom seen. Well-drained ground is a requisite, so today this species is most often found along railroads and highways where its requirements for food and shelter are satisfied. There appears to be no suitable habitat within the project footprint, but transport of turbine components often requires rebuilding or repairing roadways some distance from the destination.

The Franklin's Ground Squirrel has been documented along railroads near Hoopeston, and along former rail-beds near St. Joseph in Champaign County. Offspring can disperse up to a mile in their first season. If present, this species can be threatened during construction through the crushing and collapse of its burrows by heavy equipment. Shadow flicker cast in its territory by operating turbines may also be detrimental.

Ornate Box Turtle, *Terrapene ornata*

Effective October 30, 2009, the Ornate Box Turtle was listed by Illinois as "threatened."

This terrestrial turtle is usually found in open grasslands and fields, in contrast to its cousin, the Eastern Box Turtle, which is usually found in woodlands. This turtle hibernates underground from late September through April, so it cannot evade disturbance during that period. Its carapace carries elaborate markings, including a yellow bar along the spine, which distinguishes it from the other species. While it appears to be more common in sandy soils, it is not restricted to them. Specimens have been collected from both Iroquois and Champaign County.

As with many turtles, road-kill and over-collecting are major causes of decline. In a recent study of a northwestern Illinois population, a significant number of individuals exhibited carapace scarring from farming equipment (discs and harrows), illustrating that this species may frequently be found in rowcrop fields.

Preferred habitat of this species may not be present in the project area, but too little is known of this species' current distribution to rule out its presence. Project workers should be educated as

to its appearance and habits, remain alert for turtles on roads and in fields, and report any suspected Ornate Box Turtles to supervisors. The Department of Natural Resources should be promptly notified if any Ornate Box Turtles are identified. Once listed, it will be unlawful to move or capture an Ornate Box turtle to facilitate the project without first obtaining an Incidental Take Authorization from the Department.

Loggerhead Shrike, *Lanius ludovicianus*

The threatened Loggerhead Shrike is adapted to the savanna conditions of interspersed grasslands, shrubs, and trees. This species has been adversely affected by the decline in animal husbandry and the abandonment of the "shelter-belt" fence-row conservation practice, which has severely reduced both breeding and foraging habitat. The Shrike, also known as the "butcher bird," needs thorny trees and shrubs, even barbed wire, on which to impale its prey, which may be left for several days before being eaten. Areas which support large insects and small rodents, major food items, are also necessary. Due to losses of suitable habitat, Loggerhead Shrikes may attempt reproduction in trees near human habitations and in other areas where they would normally not be expected. The Shrike has not been reported as breeding in Vermilion County since its listing, but has been reported from Champaign County.

The primary consideration for wind energy facilities is the potential for further loss of remaining habitat, if fence-rows are cleared to avoid wind turbulence or to improve turbine exposure, or if road-side trees are cleared to create turning radii for turbine carriers or to establish power lines. A pre-construction survey to identify the presence of Shrike nests should be conducted for areas with suitable habitat if work is proposed during the breeding season in order to avoid direct mortality. "Resident" foraging birds are not thought to be at significant risk from operating wind turbines, but potential risk associated with migrants should be considered.

Black-Billed Cuckoo, *Coccyzus erythrophthalmus*

Effective October 30, 2009, the Black-Billed Cuckoo was listed by Illinois as "threatened."

This bird nests in interior thickets of forested tracts and feeds heavily on caterpillars. This species was documented as nesting at Jordan Creek of the North Fork Nature Preserve in the 1990's, and Vermilion County has thousands of acres of suitable nesting habitat along its streams and rivers. This species is not directly threatened by wind turbine construction or operation, but may be subject to collision risk as a migrant.

Migratory Birds

Bald Eagle, *Haliaeetus leucocephalus*

The Bald Eagle, de-listed under the federal Endangered Species Act last year, was recently de-listed by Illinois, effective October 30, 2009. It remains protected under the *Bald and Golden Eagle Protection Act* and the *Migratory Bird Treaty Act*, each as stringent as the better-known *Endangered Species Act*.

For several years there has been a Bald Eagle nest on the North Fork just above Lake Vermilion, about seven miles east of the project area. However, Illinois has experienced a significant increase in Bald Eagle nests over the last few years, and many new nests have not been tallied. Nests have been appearing on smaller tributaries of larger rivers in areas where Eagles have not been seen for years, and it may be assumed the Vermilion River Basin reflects this trend. Hence, it is likely that new Eagle nests will appear along the North Fork, Middle Fork, and Salt Fork during the project's life.

In addition, Illinois now has the highest population of wintering Bald Eagles in the Lower 48 States, although they tend to be concentrated around major rivers, cooling lakes, and other waters likely to remain ice-free. However, during migration, Eagles frequently fly overland. Thus, while the wind energy project is unlikely to pose any direct threat to the known Eagle nest and its surrounding hunting territory, there may be a collision risk for migrating Eagles.

Henslow's Sparrow, *Ammodramus henslowii*

The Henslow's Sparrow was de-listed by Illinois as a threatened species, effective October 30, 2009. Breeding populations of this grassland bird have been documented north of the project area, and may occur within the project area where suitable habitat exists. More northern breeding populations may migrate through the project area.

Wind turbines associated with this project have the potential to kill or injure birds through blade-strike, unless breeding populations are also found within the footprint. The species is extremely sensitive to the presence of vertical structures and to any form of break in contiguous habitat, such as roads or trails.

American Golden Plover, *Pluvialis dominica*

This migratory bird breeds in the Arctic tundra, migrates south along the Atlantic seaboard to South America in the winter, but returns northward through central North America. Areas of Illinois and Indiana provide important spring migration staging areas, which may be occupied by this species for a month or more while birds go through a molt before resuming migration. It has become a species of concern due to its relatively low global population estimate of around 300,000 birds.

Based on 25 years of Spring Bird Count data, it is likely that significant numbers of this species congregate in Counties including northern Champaign and Vermilion Counties, but the locations of large concentrations vary from year to year. Large numbers of this species are routinely observed south of Sibley Grove in Ford County. Pre- and post-construction surveys should be performed to observe this species.

Plovers tend to aggregate in dense concentrations, and are known to fly in large tight groups at or below the approximate rotor-swept elevation, which may expose them to collision mortality risk. Concerns also exist pertaining to habitat fragmentation by service roads, and displacement from habitat due to potential sensitivity to vertical structures and human activity.

A research project has begun in an effort to better understand the behavior and needs of this species, as well as how it may be affected by the presence of wind turbines. Some preliminary results were recently published [O'Neal, *et. al.* (2008)] .

One apparent finding is that the species definitely concentrates in a few areas, rather than being generally dispersed across suitable habitat, resulting in temporarily dense population "hot-spots." However, where these may be located may be influenced year-to-year by poorly understood climatic cues. Very few birds appeared in 2008 in the expected concentration areas; instead, major concentrations were located more than one hundred miles to the south. Anecdotal evidence indicates this is an unusual occurrence.

A number of observers had reported a daytime habitat preference for short grass, soybean stubble, or bare ground with standing water or residual moisture, but O'Neal first reported a night roost preference for standing corn stubble cover, with crepuscular movement between the two. O'Neal reported all observations were located more than 70 meters from adjacent roads, suggesting an intolerance for breaks in habitat. (Effects of traffic were not investigated.) Interestingly, O'Neal also reported several observations of predation of the Golden Plover by the Northern Harrier.

Whooping Crane, *Grus americana*

An experimental population of the federally-listed endangered Whooping Crane has been established with breeding grounds in Wisconsin and wintering areas in Florida. Fall 2009 will see more than 100 birds move to Florida. Whooping Cranes often "stop over" during migration and this may occur virtually anywhere in the State.

Whooping Cranes may "stop over" for extended periods. In November 2006, during their first unescorted Fall Migration, a pair of Cranes rested for four days along the upper East Branch Vermilion River (Wabash Drainage) in Ford County. A Whooping Crane extended its Spring movement by loitering near Danville until the end of June 2008.

During such stop-overs, cranes often forage on waste corn in nearby agricultural fields. Wind turbines and associated power lines pose a collision risk for these large birds, which require some distance to achieve safe altitudes. Most non-predation losses to this flock have been to power line collisions. The visibility of power lines should be maximized with appropriate line markers. The developer may wish to consider other voluntary efforts to promote Crane conservation.

Due to the very high public profile of the Whooping Crane, the Department suggests the developer/operator of this facility coordinate at least annually with the Whooping Crane Eastern Partnership (www.bringbackthecranes.org) to track the passage of Whooping Cranes through the vicinity, and explore additional measures to reduce potential losses of these birds.